Volunteer Lake Assessment Program Individual Lake Reports

SUNRISE LAKE, MIDDLETON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,112	**Max. Depth (m):**	4.1	**Flushing Rate (yr^{-1})**	2
Surface Area (Ac.):	257	**Mean Depth (m):**	1.9	**P Retention Coef:**	0.71
Shore Length (m):	5,500	**Volume (m^3):**	1,966,000	**Elevation (ft):**	666

TROPHIC CLASSIFICATION

Year	Trophic class
1977	OLIGOTROPHIC
1990	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

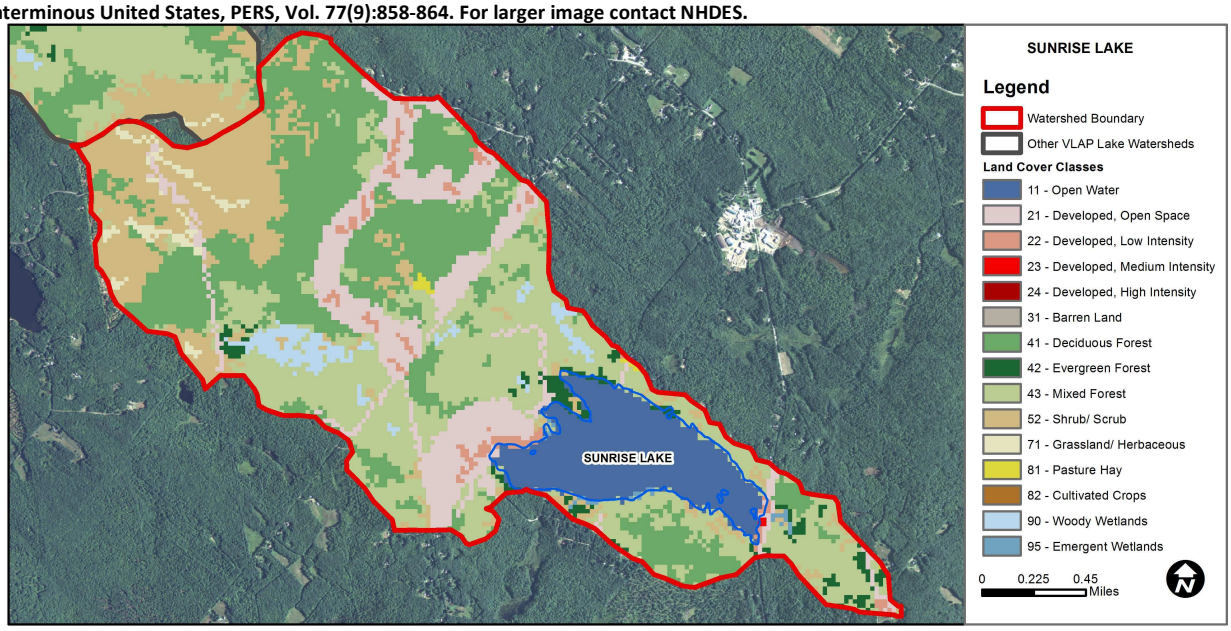
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

SUNRISE LAKE - TOWN BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	10.2	Barren Land	0	Grassland/Herbaceous	1.14
Developed-Open Space	13.2	Deciduous Forest	27.25	Pasture Hay	0.2
Developed-Low Intensity	1.75	Evergreen Forest	2.04	Cultivated Crops	0
Developed-Medium Intensity	0.04	Mixed Forest	26.96	Woody Wetlands	2.24
Developed-High Intensity	0	Shrub-Scrub	14.68	Emergent Wetlands	0.28

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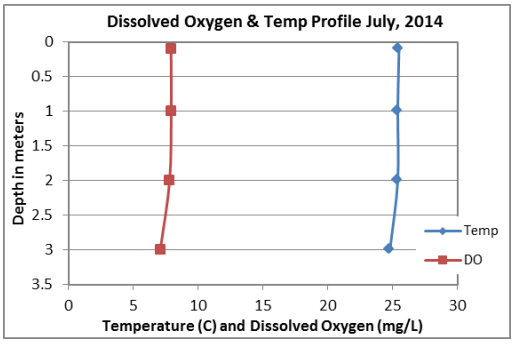
Sunrise Lake, Middleton

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly greater than the state median in July and increased slightly from 2013. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels were greater than the state medians and Epilimnetic (upper water layer) conductivity levels were the highest measured since monitoring began. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity since monitoring began.
- **E. coli:** E. coli levels were low at all stations and much less than the state standard of 88 cts/100 mL for public beaches and 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic and hypolimnetic (lower water layer) phosphorus levels were very low and much less than the state median. Deep spot phosphorus levels have decreased to low levels after a spike in 2011 and historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Pinkham cove phosphorus was low, and Tanglewood Brook phosphorus levels were within an average range for that station.
- **Transparency:** Transparency was good for the lake and transparency measured with the viewscope (VS) was better than measured without and approximately equal to the state median. Historical trend analysis indicates highly variable transparency since monitoring began.
- **Turbidity:** Epilimnetic turbidity was slightly above average for that station potentially due to algal growth and was approximately equal to hypolimnetic turbidity. Pinkham Cove turbidity was low. Tanglewood Brook turbidity was slightly above average potentially due to low flow conditions.
- **pH:** Deep spot and tributary pH levels were within the desirable range 6.5-8.0 units, however deep spot pH levels have fluctuated below the desirable range historically. Historical trend analysis indicates highly variable epilimnetic pH.
- **Recommended Actions:** Increase monitoring frequency to once per month during the summer, typically June, July and August, to better assess seasonal and historical water quality trends as well as decrease data variability. The increased epilimnetic conductivity is likely a result of winter de-icing activities, in particular the use of road salt. Encourage local road agents and winter maintenance companies to obtain a Voluntary NH Salt Applicator License through the UNH Technology Transfer Center's Green SnowPro Certification program. Educate local residents on the use of de-icing materials on driveways and walkways. Visit www.t2.unh.edu/green-snowpro-training-and-certification for more information and educational materials for homeowners. Keep up the great work!



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m^3

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

Station Name	Table 1. 2014 Average Water Quality Data for SUNRISE LAKE-MIDDLETON									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	5.0	5.31	18	87.9		6	2.88	3.13	1.38	6.81
Hypolimnion				88.6		7			1.41	6.70
Hampshire Brook			19	95.9						6.65
Main Beach					6					
Nicola Beach					4					
Nicola Beach 1					4					
Pinkham Cove				66.6	10	7			0.29	6.60
Tanglewood Brook			11	66.8		18			1.62	6.77
Town Beach					2					

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.